

[0039] By way of the drive system according to the invention, one succeeds in channeling almost all vibration components in the desired direction and in stabilizing the position of the driven device.

[0040] Given the present disclosure, further methods will be apparent to one skilled in the art to implement the above features and advantages, and the features and advantages discussed below. Further, other objects and features of the invention will become apparent from consideration of the following description taken in connection with the accompanying drawings, in which like numbers refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041] FIGS. 1a-1d shows a plan side view, side perspective view, end view, and bottom view, respectively, of a first embodiment of this invention;

[0042] FIG. 2 shows a top view of the vibratory element of FIG. 1;

[0043] FIG. 3 shows an end view of FIG. 2;

[0044] FIG. 4 shows a perspective view of a second embodiment of this invention;

[0045] FIG. 5 shows a side view of a third embodiment of this invention using a C-clamp configuration;

[0046] FIG. 6 shows a perspective view of a fourth embodiment of this invention driving multiple elements;

[0047] FIG. 7a shows a perspective view of a vibratory element of this invention containing a press-fit piezoelectric element;

[0048] FIG. 7b shows an enlarged portion of the vibratory element of FIG. 7a during assembly;

[0049] FIG. 8 shows a fifth embodiment of this invention having a press-fit piezoelectric element;

[0050] FIG. 9 shows a top view of a press-fit embodiment before deformation;

[0051] FIG. 10 shows a top view of the embodiment of FIG. 9 after deformation by a cylindrical wedge;

[0052] FIG. 11 shows a sectional view along line 11-11 of FIG. 10;

[0053] FIG. 12 shows a top view of an alternative embodiment of FIG. 9 using a rectangular wedge;

[0054] FIG. 13 shows an embodiment with the piezoelectric element offset from the axis of a resonator;